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SCREENING MALE APPLICANTS
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SCREENING MALE APPLICANTS FOR NAVY ENLISTMENT

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Recently, the Navy has experienced a premature attrition rate of more than one in every three newly enlisted personnel. The purpose of this effort was the development and evaluation of a new screening instrument that could be used by Navy recruiters in the field to estimate an applicant's probability of surviving the initial 2 years of service. Using this new instrument, the Prediction Of Enlisted Tenure - Two Years (POET-2) model, those applicants with a low probability could be screened out, resulting in a decrease in premature attrition.

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This sample consisted of essentially all nonprior service enlisted males with an active duty base date in CY 1973 (N = 68,616). Predictor data included: (1) aptitude test score, used to determine mental group, (2) years of school completed, (3) age at active duty base date, and (4) number of primary dependents. The criterion was dichotomous: survival (72%) vs. loss (28%) after a median 2 years of service. The multiple regression equation of the POET-2 model was developed on the total sample, yielding a multiple point biserial correlation of R_{pb} = .31. Cross-validation evidence was obtained by splitting the total sample into two halves, developing a separate equation on each half and applying it to the other half. The correlations obtained in this double cross-validation were r_{pb} = .30 and r_{pb} = .31. The statistical evidence shows that the model will produce reasonably accurate predictions.

Management-oriented information was prepared that illustrated the various consequences of employing alternative cutting scores in selecting applicants. This permitted examination of the tradeoffs involved in setting standards in the light of the current supply and demand picture for nonprior service enlisted males. In conclusion, the POET-2 model represents a tool that can be used effectively by Navy recruiters for screening nonprior service enlisted male applicants.

FOREWORD

This study, requested by the Navy Recruiting Command, was initiated under the Advanced Development subproject ZPN01.06 (Advanced Navy Recruiting System) and completed under the BUPERS Management Support Program (Testing and Classification, Recruit Attrition Prediction).

The POET-2 model developed under this study is intended for use by the Navy Recruiting Command and the Bureau of Naval Personnel.

Appreciation is expressed to the following persons in the Navy Recruiting Command: (1) CDR John F. Neese, Director, Research Division; (2) Ms. Dixie Kenyon, Head, Customer Service; and (3) Ms. R. A. Hammond, Statistical Assistant. These individuals have provided guidance on problems faced by recruiters in the field, provided accession data on CY 1973 recruit input, and have answered numerous questions concerning recruiting policy and data interpretation. Finally, appreciation is extended to Mr. Bud Miller, Naval Health Research Center, San Diego, California, for providing the necessary criterion data.

J. J. CLARKIN
Commanding Officer

SUMMARY

Problem

Approximately 29 percent of a sample of recruits entering the Navy in 1960 and 1961 failed to render effective service, as measured by satisfactory completion of active duty obligation and a recommendation for reenlistment by the person's commanding officer. More recently--FY 1975--the Navy has experienced an attrition rate exceeding 33 percent. For some subgroups of recruits, the attrition rate is even higher. The financial costs to the Navy, as well as the personal costs to the individuals involved, are substantial when individuals are separated prior to completion of active obligated service. A method for identifying those persons likely to render effective naval service would provide considerable savings to the Navy.

Objective

The purpose of this investigation was to develop a new instrument that could be used by recruiters in the field to estimate an applicant's probability of surviving the initial 2 years of service. Using this new instrument, called the Prediction Of Enlisted Tenure--2 years (POET-2) model, recruiters could screen out applicants with a low probability, resulting in a decrease in premature attrition.

Approach

Predictor data were collected on essentially all nonprior service enlisted males with an active duty base date in CY 1973, which was the first group to enter the Navy under the All-Volunteer Force policy and hence was not subject to draft pressure. Predictor data included: (1) aptitude test score, (2) number of years of school completed, (3) age at active duty base date, and (4) number of primary dependents. Data on the status of each person in the cohort were collected as of June 1975, resulting in a 2-year median length of service criterion. As of this date, the specific status for the original sample was categorized as follows: (1) survivors, (2) losses, and (3) indeterminates. Persons in the indeterminate category (e.g., deceased) were removed from the sample prior to the statistical analyses, leaving a dichotomous criterion of survival (72%) versus loss (28%), based upon a total of 68,616 men.

Results

The predictors were categorized into segments, as follows: (1) five mental group levels, (i.e., I, II, III-U, III-L, and IV), based upon aptitude test score, (2) four levels for years of school completed (i.e., 9-, 10-11, 12, and 13+), (3) two levels for age at active duty base date (i.e., 17 and 18+), and (4) two levels for number of primary dependents (i.e., 0 and 1+). These segments were encoded as dummy independent variables and employed in a multiple regression analysis against the binary-coded criterion of survival versus loss.

The final POET-2 model was based upon the entire sample (N = 68,616) to ensure maximum stability of the regression weights. The multiple point-biserial correlation against the dichotomous criterion was R_{pb} = .31.

Cross-validation evidence was obtained by splitting the total sample into two halves, developing a separate equation on each half, and applying it to the other half. The correlations obtained in this double cross-validation were r_{pb} = .30 and r_{pb} = .31.

There were 80 unique combinations of predictors. The 80 probability estimates produced by the POET-2 model for these combinations were organized into a single table for convenience. In addition, management-oriented information was prepared that illustrated the various consequences of employing alternative cutting scores in selecting applicants. This permitted examination of the tradeoffs involved in setting standards in the light of the current supply and demand picture for nonprior service enlisted males.

Conclusions

In conclusion, the POET-2 model represents a tool which can be used effectively by Navy recruiters for screening nonprior service enlisted male applicants. The statistical evidence shows that the model will produce reasonably accurate predictions. The availability of the analyses showing consequences of using alternative cutting scores enhances the flexibility of using the POET-2 model for the personnel manager.

Recommendations

1. The table generated by the POET-2 model should be implemented for screening all male nonprior service enlisted applicants.

2. Examine other predictor variables to determine if they can increase the effectiveness of the current model.

3. When the necessary criterion data mature, develop a revised model that predicts survival for the entire first enlistment.

CONTENTS

INTRODUCTION[1]

Problem

A longitudinal study of a cohort of nonprior service male recruits enlisting during four sampling periods in 1960 and 1961 revealed that about 29 percent of the group failed to render effective service (Plag, Note 1). The operational definition of effective service employed was satisfactory completion of obligated service and a recommendation for reenlistment by the individual's commanding officer.

The implementation of the All-Volunteer force with the concomitant elimination of draft-induced enlistments created great pressures on Navy recruiters. At the same time, premature attrition has progressively increased. The loss rate for FY 1975 was over 33 percent.[2]

The high rate of attrition prior to expiration of active obligated service causes immeasurable personal costs to the individuals involved and substantial financial costs to the Navy. According to a recent study (Lockman, 1976), the following average costs per person were appropriate for FY 1975: (1) recruiting--$964, (2) travel--$297, (3) initial uniform issue--$211, (4) recruit training--$728, (5) student pay and allowances--$988, (6) student accrued leave--$81, and (7) instructor and support personnel accrued leave--$29. Thus, the average cost of bringing each recruit to his first permanent duty station (i.e., his assignment after recruit training graduation) is $3298. Obviously, a method for screening out those applicants likely to attrite prematurely has the potential for substantial monetary savings for the Navy.

Background

In 1960, a research program was initiated at the Navy Medical Neuropsychiatric Research Unit in San Diego, California.[3] An important objective of the program was to evaluate the utility of the psychiatric screening procedures being used at the recruit training centers to assess aptitude for naval service. The sample used was 11,008 men who were followed throughout their first enlistment to determine the effectiveness of their military performance.

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[1]A nontechnical short version of this report was presented to a recent conference of the Military Testing Association (Sands, 1976).

[2]Indicated in Operational Requirements Determination Form (required by BUPERSINST 5420.18 of 3 June 1974) submitted by Pers-84 on 13 August 1975.

[3]In September 1974, the name of this organization was changed to the Naval Health Research Center.

Evaluation of the data collected indicated that the clinical procedures used in the psychiatric assessment of future military adaptation lacked practical utility. Further, it was demonstrated that a number of quantifiable predictors could be combined and used in an actuarial fashion to forecast military performance (Plag & Goffman, 1966).

One major end product of this longitudinal research program was the original Odds for Effectiveness Table (OFE-1) shown in Figure 1. This table was designed to estimate the probability that a male applicant with no prior service would render satisfactory naval service as a function of preservice attributes. More specifically, the table estimated the probability of success based on the following background information: (1) aptitude test score (e.g., Armed Forces Qualification Test (AFQT) score), (2) number of years of school completed, (3) number of expulsions and/or suspensions from school, and (4) number of arrests, excluding traffic violations. As shown, this last variable applied only to certain mental groups; that is, those obtaining an AFQT score between 31 and 64. The OFE-1 table was updated in 1968 and officially implemented at the beginning of CY 1973 (COMNAVCRUITCOMNOTE 1130 of 29 January 1973).

A problem in using the OFE-1 table was encountered by recruiting personnel in the field. As indicated in Figure 1, determination of an OFE-1 score for those applicants with AFQT scores ranging from 31 through 64, required information on the number of arrests (excluding traffic violations). This information was not required for those whose AFQT score was above or below this middle range.

For various reasons (e.g., the growing attention paid to the "invasion of privacy" issue), arrest records became increasingly difficult for the recruiter to obtain. Some law enforcement agencies refused to supply such information. This created a problem for the recruiter who had been instructed to determine an OFE-1 score for each applicant. Although various procedures for handling this missing data problem were considered (e.g., assuming zero arrests in the absence of contrary evidence), these "convenient" solutions were inadequate from an administrative and/or technical standpoint. As a result, the Navy Personnel Research and Development Center was requested to formulate a revised OFE table that would not require arrest information.

Due to the operational demand for an immediate solution, a new cohort of enlistees could not be followed throughout their first enlistment. Instead, the data originally collected in 1960 and 1961 were reevaluated, and a new OFE table was constructed that differed from the original OFE table in the following ways:

1. The arrest variable was removed.

2. The probability estimates are based upon one regression equation, whereas the original table employed three different equations, one for each of three different aptitude levels.

3. The predictor intervals are uniform throughout the table.

4. The aptitude test intervals conform to the Navy's categorization of mental group levels (Sands, Note 2).

2

The Odds for Effectiveness (OFE) Table is for use as an aid in estimating the odds for naval effectiveness for prospective first term enlistees. An effective sailor is defined as one who completes his period of active duty obligation and is recommended for reenlistment. The odds-for-effectiveness scores are based upon the results of research conducted over a period of six years with a group of approximately 11,000 enlistees who entered the naval service in 1960. The Table was updated in 1968. The odds scores are the chances in 100 that an applicant, if enlisted, will render effective service. To determine the odds score for a particular applicant, start at the left-hand side of the table (in the column marked "Test Score") and follow the line running to the characteristics which describe his background. The score appearing in the last column is the applicant's odds for effectiveness. For example, if an applicant obtains an SBTB G + A + M score of 170, completed eleven years of schooling, and was expelled from school once, he would have 73 chances in 100 of rendering effective naval service. When an applicant attains a score enclosed in a parenthesis (68 or below), a reevaluation *must* be made and an OFE score waiver in writing be entered in the enlisted service record of any such applicants considered to be eligible for enlistment. It should be emphasized that the OFE Table is an aid for recruiters to rank applicants and select the best applicants for enlistment.

Test Score	Years School Completed	Expuls. and/or Suspens.	Arrests without Traffic Violations	OFE Score Categories	Odds for Effectiveness Score
SBTB G + A + M 163 & over OR ASVAB AFQT 65-100	12+	None / One / Two+		A	93 / 88 / 79
	10-11	None / One / Two+		B	79 / 73 / (58)
	9 & under	None / One / Two+			(59) / (52) / (36)

Test Score	Years School Completed	Expuls. and/or Suspens.	Arrests without Traffic Violations	OFE Score Categories	Odds for Effectiveness Score
SBTB G + A + M 155-162 OR ASVAB AFQT 54-64	12+	0-1 None / One / Two+		C	90 / 85 / 78
		Two+ None / One / Two+			79 / 71 / (63)
	11	0-1 None / One / Two+		D	79 / 71 / (62)
		Two+ None / One / Two+			(63) / (53) / (43)
	9-10	0-1 None / One / Two+		E	72 / (63) / (53)
		Two+ None / One / Two+			(55) / (45) / (35)
	8 & under	0-1 None / One / Two+			(59) / (49) / (39)
		Two+ None / One / Two+			(40) / (31) / (23)

Test Score	Years School Completed	Expuls. and/or Suspens.	Arrests without Traffic Violations	OFE Score Categories	Odds for Effectiveness Score
SBTB G + A + M 145-154 OR ASVAB AFQT 41-53	12+	0-1 None / One / Two+		F	89 / 83 / 76
		Two+ None / One / Two+			77 / 69 / (59)
	11	0-1 None / One / Two+		G	77 / 69 / (59)
		Two+ None / One / Two+			(60) / (50) / (40)

Test Score	Years School Completed	Expuls. and/or Suspens.	Arrests without Traffic Violations	OFE Score Categories	Odds for Effectiveness Score
SBTB G + A + M 145-154 OR ASVAB AFQT 41-53	9-10	0-1 None / One / Two+		H	70 / (60) / (50)
		Two+ None / One / Two+			(52) / (42) / (32)
	8 & under	0-1 None / One / Two+			(56) / (46) / (36)
		Two+ None / One / Two+			(35) / (28) / (20)

Test Score	Years School Completed	Expuls. and/or Suspens.	Arrests without Traffic Violations	OFE Score Categories	Odds for Effectiveness Score
SBTB G + A + M 135-144 OR ASVAB AFQT 31-40	12+	0-1 None / One / Two+		J	86 / 79 / 71
		Two+ None / One / Two+			72 / (63) / (53)
	11	0-1 None / One / Two+			72 / (63) / (53)
		Two+ None / One / Two+			(55) / (45) / (35)
	9-10	0-1 None / One / Two+		K	(65) / (55) / (45)
		Two+ None / One / Two+			(46) / (36) / (28)
	8 & under	0-1 None / One / Two+			(50) / (40) / (31)
		Two+ None / One / Two+			(32) / (24) / (17)

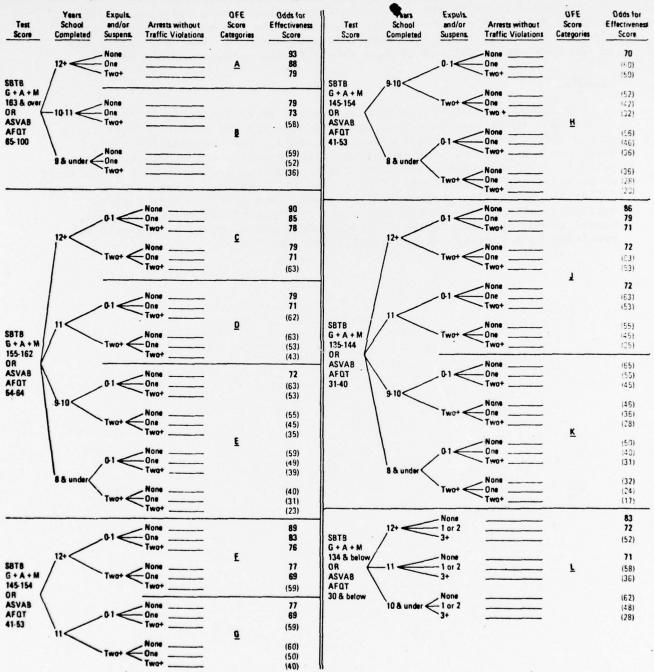| Test Score	Years School Completed	Expuls. and/or Suspens.	Arrests without Traffic Violations	OFE Score Categories	Odds for Effectiveness Score
SBTB G + A + M 134 & below OR ASVAB AFQT 30 & below	12+	None / 1 or 2 / 3+		L	83 / 72 / (52)
	11	None / 1 or 2 / 3+			71 / (58) / (36)
	10 & under	None / 1 or 2 / 3+			(62) / (48) / (28)

Figure 1. Original Odds for Effectiveness Table for use with Navy applicants for enlistment.

3

This revised OFE table (Figure 2) was submitted to the Navy Recruiting Command with the recommendation that it supersede the original OFE table. As of 1 October 1975, the revised table (OFE-2) was incorporated into the Navy Recruiting Manual, Enlisted and became operational for screening all male nonprior service enlisted applicants.

The OFE-2 table represented an interim solution to a pressing operational problem, since the data used for constructing the table are about 15 years old. In addition, these data were collected during a time when enlistment in the Navy was influenced to some extent by the pressure of the draft.

Purpose

The global purpose of the overall project is to develop effective tools to aid Navy recruiters in screening applicants for enlistment. These tools should reduce the substantial financial, social, and personal costs of erroneous acceptances. The objective of the specific effort described herein is to develop an instrument that can provide the recruiter with an estimate of an applicant's probability of surviving for 2 years. Using this instrument, called the Prediction Of Enlisted Tenure--2 years (POET-2) model, those applicants with a low probability, based on years of education completed, mental group, age, and number of primary dependents, could be screened out, resulting in a decrease in premature attrition.

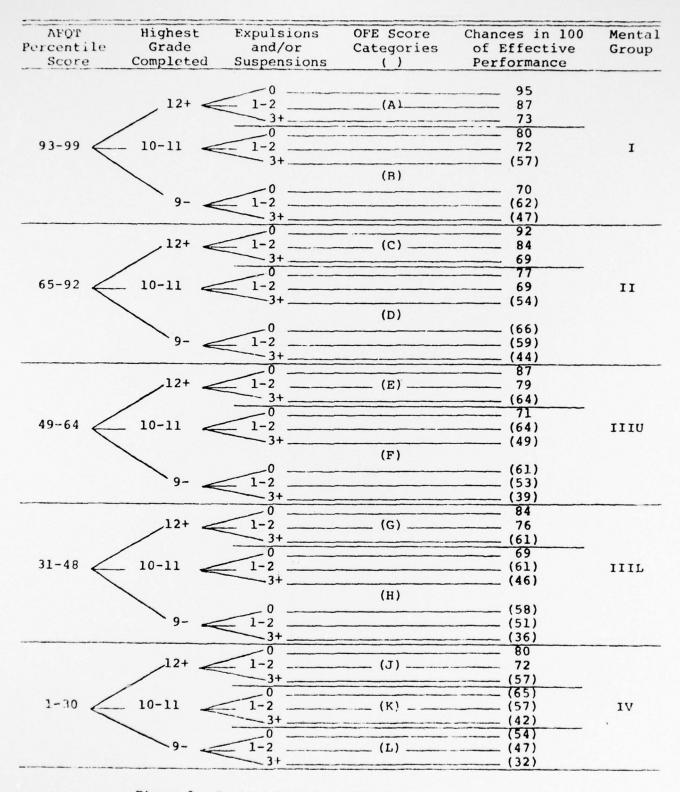| AFQT Percentile Score	Highest Grade Completed	Expulsions and/or Suspensions	OFE Score Categories ( )	Chances in 100 of Effective Performance	Mental Group
93-99	12+	0		95	I
		1-2	(A)	87	
		3+		73	
	10-11	0		80	
		1-2		72	
		3+		(57)	
			(B)		
	9-	0		70	
		1-2		(62)	
		3+		(47)	
65-92	12+	0		92	II
		1-2	(C)	84	
		3+		69	
	10-11	0		77	
		1-2		69	
		3+		(54)	
			(D)		
	9-	0		(66)	
		1-2		(59)	
		3+		(44)	
49-64	12+	0		87	IIIU
		1-2	(E)	79	
		3+		(64)	
	10-11	0		71	
		1-2		(64)	
		3+		(49)	
			(F)		
	9-	0		(61)	
		1-2		(53)	
		3+		(39)	
31-48	12+	0		84	IIIL
		1-2	(G)	76	
		3+		(61)	
	10-11	0		69	
		1-2		(61)	
		3+		(46)	
			(H)		
	9-	0		(58)	
		1-2		(51)	
		3+		(36)	
1-30	12+	0		80	IV
		1-2	(J)	72	
		3+		(57)	
	10-11	0		(65)	
		1-2	(K)	(57)	
		3+		(42)	
	9-	0		(54)	
		1-2	(L)	(47)	
		3+		(32)	

Figure 2.   Revised Odds for Effectiveness Table.

5

Sample

Data were available on essentially all nonprior service enlisted male accessions with an active duty base date in CY 1973. This cohort was the first group to enter the Navy under the All-Volunteer Force policy and hence was not subject to draft pressure. While accession data were available on persons entering the Navy after CY 1973, the desirability of mature criterion data, coupled with the large sample size suggested that this single-year group was ideal for the planned analyses.

Criterion data on the cohort were obtained as of June 1975. Thus, persons with an active duty base date (ADBD) in January 1973 would have served 30 months while those with an ADBD in December 1973 would have served 18 months, producing a criterion based upon a 2-year median length of service. The specific status, as of June 1975, for the original sample of men was categorized as follows: (1) survivors, (2) losses, and (3) indeterminates. The indeterminates (e.g., those who were deceased), were removed from the sample prior to the statistical analyses, leaving a final sample of 68,616, which included 49,470 (72%) survivors and 19,146 (28%) losses. The total sample was comprised of (1) a majority sample (N = 61,116), entirely composed of Caucasians, and (2) a minority sample (N = 7500), of which 91 percent were Negroes, and 9 percent, American Indians, Malayans, and Mongolians.

Table 1 presents sample frequency distributions by (1) racial group, (2) month of ADBD, (3) Navy Recruiting Area,[4] (4) acquisition type, (5) entry status under the Medical Remedial Program, and (6) status of participation in a Junior ROTC Program. As shown, the months of June, July, August, and September accounted for about 48 percent of this cohort. Also, it should be noted that 3202 USNR accessions were included in the sample. Although this group represents only about 5 percent of the total sample, it was considered important to include them since the prediction tables resulting from this study are designed to be used for both USN and USNR applicants under the "One Navy" concept, as directed in the Navy Recruiting Manual, Enlisted.

Table 2 provides information on the losses. As shown the honorable discharge accounted for about 49 percent of the total number.

To construct the Prediction Of Enlisted Tenure--2 years (POET-2) model, the following sample formation procedure was followed: one half of the survivors (N = 24,735) and one half of the losses (N = 9573) were randomly selected to form a development sample; and the other half, of each criterion group was used to form an evaluation sample to be used for cross-validation. This was done to equate the base rate[5] in the development and evaluation samples, thereby reducing potential bias. The total sample (N = 68,616) was used to construct the final equation of the POET-2 model, and both subsamples were used to produce cross-validation evidence for the model.

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[4]The Navy Recruiting Areas have been redefined since these data were collected.

[5]The base rate represents the proportion of survivors in the group. For example, if 70 men survived out of 100 entering a program, the base rate would be 0.70.

Table 1

Sample Frequency Distribution by Descriptive Variables

Item	Majority (N = 61,116)		Minority (N = 7500)		(N = 68,616)	
	N	%	N	%	N	%
Racial Group						
Caucasian	61116	100.00	---	---	61116	89.07
Negro	---	---	6795	90.60	6795	9.90
American Indian	---	---	270	3.60	270	0.39
Malayan	---	---	292	3.89	292	0.43
Mongolian	---	---	143	1.91	143	0.21
CY 1973 Active Duty Base Date						
January	4210	6.89	384	5.12	4594	6.70
February	3854	6.31	377	5.03	4231	6.17
March	3863	6.32	429	5.72	4292	6.26
April	3403	5.57	362	4.83	3765	5.49
May	3442	5.63	435	5.80	3877	5.65
June	7169	11.73	1056	14.08	8225	11.99
July	6936	11.35	905	12.07	7841	11.43
August	7470	12.22	955	12.73	8425	12.28
September	7233	11.83	937	12.49	8170	11.91
October	5420	8.87	613	8.17	6033	8.79
November	4692	7.68	587	7.83	5279	7.69
December	3424	5.60	460	6.13	3884	5.66
Navy Recruiting Area						
1 - Albany	9178	15.02	985	13.13	10163	14.81
2 - Richmond	5235	8.57	1002	13.36	6237	9.09
3 - Macon	5701	9.66	1586	21.15	7487	10.91
4 - Columbus	7873	12.88	695	9.27	8568	12.49
5 - Chicago	8206	13.43	1024	13.65	9230	13.45
6 - Omaha	6581	10.77	235	3.13	6816	9.93
7 - Dallas	6918	11.32	1091	14.55	8009	11.67
8 - San Francisco	11187	18.30	878	11.71	12065	17.58
0 - Extra-Continental Activities	37	0.06	4	0.05	41	0.06
Acquisition Type						
Nonprior Service	28608	46.81	4892	65.23	33500	48.82
Returning CACHE	29808	48.77	2106	28.08	31914	46.51
USNR	2700	4.42	502	6.69	3202	4.67
Medical Remedial Program						
MREP	2290	3.75	206	2.75	2496	3.64
Not MREP	58826	96.25	7294	97.25	66120	96.36
Junior ROTC Program						
Affiliated	1280	2.09	491	6.55	1771	2.58
Not Affiliated	2147	3.51	494	6.59	2641	3.85
Not Available	57689	94.39	6515	86.87	64204	93.57

Table 2

Frequency Distribution of Losses by Discharge Type

Outcome Type	Majority (N = 16,587)		Minority (N = 2559)		Total (N = 19,146)	
	N	%	N	%	N	%
Honorable Discharge	8115	48.92	1197	46.78	9312	48.64
General Discharge	6723	40.53	1159	45.29	7882	41.17
Undesirable Discharge	950	5.73	76	2.97	1026	5.36
Bad Conduct Discharge	32	0.19	4	0.16	36	0.19
Other (e.g., Desertion)	767	4.62	123	4.81	890	4.65

Use of the survival versus loss criterion departs from the method used in developing the original and revised Odds for Effectiveness (OFE) tables where the criterion used was effectiveness versus noneffectiveness. However, as in the previous studies, indeterminates (e.g., those who were deceased) were removed prior to statistical analyses in developing both OFE tables.

Predictors

Four types of information, which are collected routinely by Navy recruiters for all applicants, were chosen to use in predicting the probability of survival: (1) years of education completed (GED was considered as completion of 12 years), (2) mental group as defined by the Armed Forces Qualification Test (AFQT) score level, based upon the Short Basic Test Battery (SBTB), (3) age at active duty base date, and (4) number of primary dependents. The first three variables have demonstrated predictive value consistently in studies conducted for different military services (Gordon & Bottenberg, 1962; Fisher, Ward, Holdrege, & Lawrence, 1960; Klieger, Dubuisson, & deJung, 1961; and Plag, 1962). The last variable--number of primary dependents--was found to be related to premature attrition during the first year of service for naval enlistees (Lockman, 1976).

Table 3 shows the sample frequency distribution for these four predictor variables. As shown, approximately 71 percent of the total cohort were high school graduates or had earned a GED.

The Navy Recruiting Command uses a 2 x 2 design that combines the first two variables--education and mental group--to formulate and evaluate recruiting policy. The four cells (A-D) of this design represent four recruit quality categories, which are defined as follows:

1. A--School eligible and high school graduate.

2. B--School eligible and non-high school graduate.

3. C--Nonschool eligible and high school graduate.

4. D--Nonschool eligible and non-high school graduate.

9

Table 3

Sample Frequency Distribution by Predictor Variables

Item	Majority (N = 61,116)		Minority (N = 7500)		Total (N = 68,616)	
	N	%	N	%	N	%
Years of Education Completed						
6–	2	0.00 ⎫	1	0.01 ⎫	3	0.00 ⎫
7	27	0.04 ⎬ 3.34	2	0.03 ⎬ 1.55	29	0.04 ⎬ 3.14
8	259	0.42	11	0.15	270	0.39
9	1753	2.87 ⎭	102	1.36 ⎭	1855	2.70 ⎭
10	7608	12.45 ⎫ 25.25	698	9.31 ⎫ 30.03	8306	12.11 ⎫ 25.77
11	7824	12.80 ⎭	1554	20.72 ⎭	9378	13.67 ⎭
12 or GED	38833	63.54 63.54	4543	60.57 60.57	43376	63.22 63.22
13	2490	4.07 ⎫	265	3.53 ⎫	2755	4.02 ⎫
14	1513	2.48	195	2.60	1708	2.49
15	352	0.58 ⎬ 7.87	69	0.92 ⎬ 7.85	421	0.61 ⎬ 7.87
16	429	0.70	59	0.79	488	0.71
17+	26	0.04 ⎭	1	0.01 ⎭	27	0.04 ⎭
Mental Group						
I	1943	3.18	20	0.27	1963	2.86
II	23541	38.52	698	9.31	24239	35.33
III–U	18104	29.62	1896	25.28	20000	29.15
III–L	16069	26.29	4288	57.17	20357	29.67
IV	1459	2.39	598	7.97	2057	3.00
Age at Active Duty Base Date						
17	17551	28.72 28.72	1703	22.71 22.71	19254	28.06 28.06
18	22014	36.02 ⎫	2486	33.15 ⎫	24500	35.71 ⎫
19	11692	19.13	1522	20.29	13214	19.26
20	5083	8.32	783	10.44	5866	8.55
21	2260	3.70	401	5.35	2661	3.88
22	1253	2.05 ⎬ 71.28	281	3.75 ⎬ 77.29	1534	2.24 ⎬ 71.94
23	606	0.99	151	2.01	757	1.10
24	278	0.45	71	0.95	349	0.51
25	145	0.24	39	0.52	184	0.27
26+	234	0.38 ⎭	63	0.84 ⎭	297	0.43 ⎭
Primary Dependents						
0	57387	93.90 93.90	7019	93.59 93.59	64406	93.86 93.86
1	2193	3.59 ⎫	238	3.17 ⎫	2431	3.54 ⎫
2	1414	2.31 ⎬ 6.10	231	3.08 ⎬ 6.41	1645	2.40 ⎬ 6.14
3+	122	0.20 ⎭	12	0.16 ⎭	134	0.20 ⎭

School eligibility is operationally defined in terms of mental group. That is, persons in mental groups I, II, and III-Upper, representing AFQT scores between 49 and 99 inclusive, are classified as school eligible, while those in mental groups III-Lower and IV, representing AFQT scores between 10 and 48 inclusive, are considered nonschool eligible. Table 4 provides the sample frequency distribution by these four recruit quality categories. It is obvious that, while there is little difference between the percentage of majority and minority high school graduates (71 vs. 68%), there is a marked difference between the percentages of those qualifying as school eligible (71 vs. 35%).

Table 4

Sample Frequency Distribution by Recruit Quality Category

Item	High School Grad.		Non-High School Grad.		Total	
	N	%	N	%	N	%
Majority (N = 61,116)						
School eligible	34610	56.63	8978	14.69	43588	71.32
Nonschool eligible	9033	14.78	8495	13.90	17528	28.68
TOTAL	43643	71.41	17473	28.59	61116	100.00
Minority (N = 7500)						
School eligible	1971	26.28	643	8.57	2614	34.85
Nonschool eligible	3161	42.15	1725	23.00	4886	65.15
TOTAL	5132	68.43	2368	31.57	7500	100.00
Total (N = 68,616)						
School eligible	36581	53.31	9621	14.02	46202	67.33
Nonschool eligible	12194	17.77	10220	14.90	22414	32.67
TOTAL	48775	71.08	19841	28.92	68616	100.00

Returning again to Table 3, we find that a greater percentage of the majority group enlisted at age 17 than did the minority group (29 vs. 23%), but statistics for the two groups are very similar in regard to primary dependents.

11

Analyses

Frequency distributions were formed on variables considered important for the study, either for the purpose of description or prediction. Some of these frequency distributions were presented previously in Tables 1-4.

Descriptive data, such as frequency distributions, provide interesting information on the characteristics of a sample. However, the major purpose of this effort is to develop a model that can be used to make predictions about individuals in the future. Often, it is convenient to base these predictions on a composite that combines the information from a number of separate predictor variables. Multiple linear regression analysis is a commonly used approach for forecasting a criterion from a number of predictor variables.

Whenever a multiple regression analysis is performed, two conflicting objectives exist. The first, and most important, objective is to obtain an equation with weights that are as stable as possible. This is achieved by using all available data in developing the regression weights, the procedure followed in constructing the prediction equation of the POET-2 model. The other objective is to evaluate the accuracy or effectiveness of the equation. Since an unbiased estimate of the accuracy can be obtained only on a sample of cases that was not used in the development of the regression weights, a holdout sample must be removed from the total sample prior to developing the weights, thereby decreasing the stability of the weights (the first objective).

As indicated previously, the total sample was equally divided into a development sample and an evaluation sample, in such a way as to insure comparable base rates. A regression equation was constructed in the development group and applied to the evaluation group and vice versa, and the two cross-validities were averaged to obtain a conservative estimate of the accuracy of the POET-2 model equation. This procedure is known as double cross-validation (Mosier, 1951).

As Taylor and Russell (1939) argued in a classic paper in psychometrics, the efficacy of a selection instrument cannot be evaluated solely on the basis of a validity coefficient. They demonstrated that the utility or value of a selection test was a function of three considerations: (1) the base rate (the proportion of survivors in the unselected group), (2) the validity[6] of the test (the correlation between the test and the criterion), and (3) the selection ratio (the proportion of the applicants accepted into a program).

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[6]The validity coefficient appropriate for using these tables is either a product-moment correlation using a continuous criterion variable or a biserial correlation using a dichotomized underlying normally distributed criterion variable. The point-biserial validity coefficient is inappropriate for the Taylor-Russell tables. When a point-biserial correlation is the most appropriate index of validity, another set of tables should be employed (Abrahams, Alf, & Wolfe, 1971).

As has been previously contended (Sands, 1970, 1971, 1973), the evaluation of a selection instrument should look beyond the validity coefficient. Rather, the impact resulting from its application under varying selection ratios should be examined in terms of the following four selection decision-outcome combinations:

1. Erroneous rejections (rejecting a person who would have succeeded if given the opportunity).

2. Correct rejections (rejecting a person who would have failed if given the opportunity).

3. Erroneous acceptances (selecting a person who subsequently fails).

4. Correct acceptances (selecting a person who subsequently succeeds).[7]

To evaluate the consequences of implementing the POET-2 model, the following information was determined for each possible cutting score:

1. The selection ratio.

2. The survival rate (the proportion of persons selected who are survivors).

3. The hit rate (the proportion of correct decisions).

4. The number of correct rejections.

5. The number of erroneous rejections.

6. The number of correct acceptances.

7. The number of erroneous acceptances.

8. The total number rejected.

9. The total number accepted.

10. The number of persons accepted into the four recruit quality categories:

   a. High school graduate and school eligible.

   b. Non-high school graduate and school eligible.

   c. High school graduate and non-school eligible.

   d. Non-high school graduate and non-school eligible.

These values were computed for the majority, minority, and total samples.

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[7]This terminology follows Curtis (1967) and seems far more appropriate to personnel selection than the more traditional terminology based upon a disease model of medicine (e.g., "false positives").

13

In addition to providing a more useful evaluation of the POET-2 model than is possible with a validity coefficient, these analyses provide Navy personnel managers with the opportunity to examine the consequences of employing alternative cutting scores. This information could be vitally important in planning and monitoring recruitment policy under changing recruiting climates.

14

Survival Rates by Predictor

Table 5 presents the survival rates for the majority, minority, and total samples by each of the four predictor variables. As shown, the survival rate increases as years of education increase.

Table 5

Survival Rates by Predictor Variable

Predictor Variable	Majority (N = 61,116)	Minority (N = 7500)	Total (N = 68,616)
Years of Education Completed			
9-	.429	.448	.430
10-11	.545	.480	.537
12 or GED	.799	.731	.792
13+	.874	.829	.869
Mental Group			
I (AFQT 93-99)	.878	.950	.878
II (AFQT 65-92)	.813	.795	.812
III-Upper (AFQT 49-64)	.713	.685	.710
III-Lower (AFQT 31-48)	.611	.618	.613
IV (AFQT 10-30)	.662	.696	.672
Age at ADBD			
17	.609	.564	.605
18+	.777	.687	.766
Primary Dependents			
0	.731	.661	.724
1+	.686	.620	.679

Mental Group, in accordance with Navy use, is presented as five distinct categories. Examination of the survival rates for the five mental groups shows the expected progression, except for the bottom two groups, which show an inversion. This might be attributed to the relatively small proportion of mental group IV personnel (3%) as contrasted to the large number in mental group III-L (30%). Perhaps the members of the small group who were allowed to enlist were superior in other respects.

Data for the last two factors were dichotomized. As shown, persons enlisting at age 17 have a lower rate of survival than do persons 18 or older. Persons with no primary dependents evidenced a higher survival rate than did those with one or more.

POET-2 Model Specification

The POET-2 model is based upon a multiple linear regression equation with the following general form:

$$P(S) = w_0 U + w_1 X^{(1)} + w_2 X^{(2)} + \ldots + w_j X^{(j)} + \ldots + w_k X^{(k)} + E \qquad (1)$$

where:[8]

$P(S)$ represents the probability of survival for 2 years,

w_0 represents the weight associated with the unit vector (the additive constant or intercept),

U represents the unit vector of dimension $\underline{n}$, with all elements equal to unity,

w_j represents the weight associated with the $X^{(j)}$ predictor vector of dimension $\underline{k}$,

$X^{(j)}$ represents the jth predictor vector of dimension $\underline{n}$ ($j = 1,2,\ldots,k$),

and

E represents the error vector of dimension $\underline{n}$.

The unknown weights w_0 and w_j ($j = 1,2,\ldots,k$) are chosen to minimize E, the error vector.

The actual POET-2 model is specified by the following equation:

$$P(S) = .84544\ U -.29614\ ED9L -.21069\ ED1011 + .04869\ ED13H + .03291\ MG1 \qquad (2)$$

$$-.04643\ MG3U -.10452\ MG3L -.13914\ MG4 -.04475\ AGE17 -.07114\ PDEP$$

where:

$P(S)$ represents the probability of surviving 2 years,

U represents unity (1),

ED9L represents 9 years of education or less,

ED1011 represents 10 or 11 years of education,

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[8]This notation follows Ward and Jennings (1973).

ED13H represents 13 years of education or higher,

MG1 represents Mental Group I,

MG3U represents Mental Group III-Upper,

MG3L represents Mental Group III-Lower,

MG4 represents Mental Group IV,

AGE17 represents age 17 at active duty base date, and

PDEP represents one or more primary dependents.

The nine predictor variables are in dummy variable form where they take on a value of "1" if appropriate and a value of "0" if not. Note that one level of each predictor is not explicitly stated in the equation. These levels are subsumed under the regression intercept (w_0U). This means that the group of persons with 12 years of education (or GED), in Mental Group II, age 18 or older, and with no primary dependents acts as a control group for the equation (Kerlinger & Pedhazur, 1973).

The application of the POET-2 model can be illustrated using a hypothetical applicant with the following characteristics: (1) 12 years of education completed, (2) an AFQT score that places him in the upper portion of mental group III, (3) age 18, and (4) two primary dependents. Encoding this predictor information into dummy variable form ("1" if appropriate and "0" if not) and substituting into the above equation gives:

$$P(S) = .84544 \ (1) \ -.29614 \ (0) \ -.21069 \ (0) \ +.04869 \ (0) \ +.03291 \ (0) \ -.04643 \ (1) \ -.10452 \ (0) \ -.13914 \ (0) \ -.04475 \ (0) \ -.07114 \ (1)$$

$$P(S) = .72787$$

The best estimate of this applicant's chances of surviving the first 2 years of service is 73 chances in 100.

Chances of Survival

To eliminate the necessity of substituting the appropriate values into the regression equation and computing an estimated probability of survival for each male nonprior service enlisted applicant, all 80 unique combinations of predictors for the POET-2 model were computed and tabled. As shown in Table 6, these predictions were organized into a single table designed for application to all male nonprior service prospective enlistees. Scores produced by the POET-2 model range from 93 to 29, thus permitting considerable flexibility in setting cutting scores to accommodate fluctuation in manpower supply and demand.

17

Table 6

POET-2 Model Chances of Survival

Mental Group	Primary Dependents	9- Years Education		10-11 Years Education		12 Years Education[a]		13+ Years Education	
		Age 17	Age 18+	Age 17	Age 18+	Age 17	Age 18+	Age 17	Age 18+
I	No	54	58	62	67	83	88	88	93
	Yes	47	51	55	60	76	81	81	86
II	No	50	55	59	63	80	85	85	89
	Yes	43	48	52	56	73	77	78	82
III-U	No	46	50	54	59	75	80	80	85
	Yes	39	43	47	52	68	73	73	78
III-L	No	40	44	49	53	70	74	74	79
	Yes	33	37	41	46	63	67	67	72
IV	No	37	41	45	50	66	71	71	75
	Yes	29	34	38	42	59	64	64	68

[a]GED is considered as 12 years of education.

18

Validation and Cross-Validation

The multiple correlation coefficient for the POET-2 model computed on the total sample of 68,616 men was $R_{pb} = .31$. The multiple regression equations constructed on the development $(R_{pb} = .31)$ and evaluation $(R_{pb} = .30)$ samples and applied to the evaluation and development samples respectively gave cross-validities of $r_{pb} = .30$ and $r_{pb} = .31$. The results of this double cross-validation indicated that the POET-2 model produces stable predictions.

Management-Oriented Information

The statistical results that have been presented are necessary but not sufficient. Validity coefficients and related indices do not provide any direct information on the consequences of applying a selection procedure. Table 7 illustrates the consequences of applying the POET-2 model to the sample at alternative cutting scores.

The scores in the left hand column are the probability of surviving 2 years, as estimated by the POET-2 model. These scores are the numbers contained in the chances for survival table designed for use by recruiters in the field.

The selection ratio (second column) is the proportion selected; and the survival rate (third column), the number of survivors divided by the number accepted at a particular cutting score. The hit rate (fourth column) represents the proportion of correct selection decisions (i.e., correct rejections and acceptances).

The next six columns show the number of each of the four decision-outcome combinations, and the total number rejected and total number accepted. Finally, the last four columns show the number of persons accepted who are in each of the four recruit quality categories.

To illustrate the use of this table, let us examine the consequences of applying a cut score of 54. This strategy would select 83.5 percent of the original sample. The survival rate for the group selected would be 76.7 percent and the percent of correct decisions or hit rate would be 72.6 percent. A total of 5826 persons would be correctly rejected; 5515 erroneously rejected; 43,955 correctly accepted; and 13,320 erroneously accepted. Thus, 11,341 men would be rejected while 57,275 would be accepted. Of this group of selectees, 36,581 would be in recruit quality category A; 8500, in B; 12,194 in C; and none, in D.

Using this table, the manager of the personnel system can evaluate the consequences of employing alternative cutting scores in terms of various tradeoffs and can weight these consequences in the light of the current supply and demand picture for nonprior service enlisted males.

19

Table 7

Consequences of Using the POET-2 Model for Total Group

Cut Score	Select. Ratio	Surviv. Rate	Hit Rate	Number Correct Reject.	Number Error. Reject.	Number Correct Accept.	Number Error. Accept.	Total Number Reject.	Total Number Accept.	HSG SE (A)	NHSG SE (B)	HSG NSE (C)	NHSG NSE (D)
99	0.0	1.000	0.279	19146	49470	0	0	68616	0	0	0	0	0
98	0.0	1.000	0.279	19146	49470	0	0	68616	0	0	0	0	0
97	0.0	1.000	0.279	19146	49470	0	0	68616	0	0	0	0	0
96	0.0	1.000	0.279	19146	49470	0	0	68616	0	0	0	0	0
95	0.0	1.000	0.279	19146	49470	0	0	68616	0	0	0	0	0
94	0.0	1.000	0.279	19146	49470	0	0	68616	0	0	0	0	0
93	0.008	0.904	0.286	19093	48969	501	53	68062	554	554	0	0	0
92	0.008	0.904	0.286	19093	48969	501	53	68062	554	554	0	0	0
91	0.008	0.904	0.286	19093	48969	501	53	68062	554	554	0	0	0
90	0.008	0.904	0.286	19093	48969	501	53	68062	554	554	0	0	0
89	0.049	0.884	0.317	18757	46499	2971	389	65256	3360	3360	0	0	0
88	0.064	0.884	0.328	18638	45582	3888	508	64220	4396	4396	0	0	0
87	0.064	0.884	0.328	18638	45582	3888	508	64220	4396	4396	0	0	0
86	0.065	0.884	0.329	18625	45507	3963	521	64132	4484	4484	0	0	0
85	0.282	0.853	0.479	16306	32938	16532	2840	49244	19372	19372	0	0	0
84	0.282	0.853	0.479	16306	32938	16532	2840	49244	19372	19372	0	0	0
83	0.284	0.854	0.480	16290	32818	16652	2856	49108	19508	19508	0	0	0
82	0.290	0.854	0.484	16245	32490	16980	2901	48735	19881	19881	0	0	0
81	0.291	0.854	0.485	16227	32414	17056	2919	48641	19975	19975	0	0	0
80	0.471	0.835	0.595	13810	22473	26997	5336	36283	32333	32333	0	0	0
79	0.478	0.835	0.599	13720	22071	27399	5426	35791	32823	32333	0	492	0
78	0.480	0.835	0.600	13701	21987	27483	5445	35688	32928	32436	0	492	0
77	0.496	0.833	0.610	13484	21126	28344	5662	34610	34006	33514	0	492	0
76	0.496	0.833	0.610	13482	21120	28350	5664	34602	34014	33522	0	492	0
75	0.531	0.827	0.626	12859	19349	30121	6287	32208	36408	35837	0	571	0
74	0.641	0.814	0.681	10958	13689	35781	8188	24647	43969	35837	0	8132	0
73	0.651	0.812	0.685	10733	13213	36257	8413	23946	44670	36538	0	8132	0
72	0.652	0.812	0.685	10724	13173	36297	8422	23897	44719	36538	0	8181	0
71	0.674	0.808	0.694	10267	12125	37345	8879	22392	46224	36538	0	9686	0
70	0.700	0.803	0.703	9683	10906	38564	9463	20589	48027	36538	0	11489	0
69	0.700	0.803	0.703	9683	10906	38564	9463	20589	48027	36538	0	11489	0
68	0.701	0.803	0.703	9668	10872	38598	9478	20540	48076	36581	0	11495	0
67	0.707	0.801	0.705	9503	10574	38896	9643	20077	48539	36581	20	11938	0
66	0.709	0.801	0.706	9465	10470	39000	9681	19935	48681	36581	20	12080	0
65	0.709	0.801	0.706	9465	10470	39000	9681	19935	48681	36581	20	12080	0
64	0.711	0.801	0.706	9430	10429	39041	9716	19859	48757	36581	20	12156	0
63	0.727	0.798	0.712	9057	9698	39772	10089	18755	49861	36581	1088	12192	0
62	0.727	0.798	0.712	9048	9687	39783	10098	18735	49881	36581	1108	12192	0
61	0.727	0.798	0.712	9048	9687	39783	10098	18735	49881	36581	1108	12192	0
60	0.727	0.798	0.712	9047	9686	39784	10099	18733	49883	36581	1110	12192	0
59	0.782	0.782	0.721	7469	7483	41987	11677	14952	53664	36581	4889	12194	0
58	0.782	0.782	0.721	7468	7482	41988	11678	14950	53666	36581	4891	12194	0
57	0.782	0.782	0.721	7468	7482	41988	11678	14950	53666	36581	4891	12194	0
56	0.784	0.782	0.721	7411	7405	42065	11735	14816	53800	36581	5025	12194	0
55	0.784	0.782	0.721	7401	7392	42078	11745	14793	53823	36581	5048	12194	0
54	0.835	0.767	0.726	5826	5515	43955	13320	11341	57275	36581	8500	12194	0
53	0.883	0.753	0.726	4189	3829	45641	14957	8018	60598	36581	8500	12194	3323
52	0.888	0.752	0.726	4029	3655	45815	15117	7684	60932	36581	8834	12194	3323
51	0.888	0.752	0.726	4028	3655	45815	15118	7683	60933	36581	8835	12194	3323
50	0.893	0.751	0.727	3880	3488	45982	15266	7368	61248	36581	9055	12194	3418

Table 7 (Continued)

Cut Score	Select. Ratio	Surviv. Rate	Hit Rate	Number Correct Reject.	Number Error. Reject.	Number Correct Accept.	Number Error. Accept.	Total Number Reject.	Total Number Accept.	Number Accepted by Recruit Quality Category			
										HSG SE (A)	NHSG SE (B)	HSG NSE (C)	NHSG NSE (D)
49	0.963	0.732	0.726	1433	1082	48388	17713	2515	66101	36581	9055	12194	8271
48	0.963	0.732	0.726	1433	1081	48389	17713	2514	66102	36581	9056	12194	8271
47	0.964	0.732	0.726	1398	1039	48431	17748	2437	66179	36581	9133	12194	8271
46	0.976	0.728	0.725	964	692	48778	18182	1656	66960	36581	9576	12194	8609
45	0.977	0.728	0.725	924	637	48833	18222	1561	67055	36581	9576	12194	8704
44	0.982	0.727	0.724	733	493	48977	18413	1226	67390	36581	9576	12194	9039
43	0.983	0.727	0.724	712	481	48989	18434	1193	67423	36581	9609	12194	9039
42	0.983	0.727	0.724	705	477	48993	18441	1182	67434	36581	9609	12194	9050
41	0.984	0.726	0.724	650	439	49031	18496	1089	67527	36581	9609	12194	9143
40	0.998	0.722	0.722	84	42	49428	19062	126	68490	36581	9609	12194	10106
39	0.998	0.722	0.722	77	37	49433	19069	114	68502	36581	9621	12194	10106
38	0.998	0.722	0.722	76	36	49434	19070	112	68504	36581	9621	12194	10108
37	1.000	0.721	0.721	17	9	49461	19129	26	68590	36581	9621	12194	10194
36	1.000	0.721	0.721	17	9	49461	19129	26	68590	36581	9621	12194	10194
35	1.000	0.721	0.721	17	9	49461	19129	26	68590	36581	9621	12194	10194
34	1.000	0.721	0.721	15	8	49462	19131	23	68593	36581	9621	12194	10197
33	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
32	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
31	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
30	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
29	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
28	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
27	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
26	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
25	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
24	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
23	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
22	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
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11	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
10	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
9	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
8	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
7	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
6	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
5	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
4	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
3	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
2	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220
1	1.000	0.721	0.721	0	0	49470	19146	0	68616	36581	9621	12194	10220

CONCLUSIONS AND RECOMMENDATION

In conclusion, the POET-2 model represents a tool that can be used effectively by Navy recruiters for screening nonprior service enlisted male applicants. The statistical evidence shows that the model will produce reasonably accurate predictions. The availability of the analyses showing consequences of using alternative cutting scores enhances the flexibility of using the POET-2 model for the personnel manager.

It is recommended that the POET-2 model table be implemented for screening all male nonprior service applicants for enlistment in the Navy. Additional research and development should be conducted that addresses the problem of reducing premature attrition of enlisted personnel. Various other potential predictor variables (e.g., employment history) should be examined to determine if they can increment the effectiveness of the model discussed in this report. In addition, it should be remembered that the POET-2 model is based upon an intermediate criterion (2 years). Thus, as the necessary criterion data mature, a revised model should be developed that predicts survival for the entire first enlistment.

REFERENCES

Abrahams, N. M., Alf, E. F., & Wolfe, J. H. Taylor-Russell tables for dichotomous criterion variables, Journal of Applied Psychology, 1971, 55, 449-457.

Curtis, E. W. The application of decision theory and scaling methods to selection test evaluation (Tech. Bulletin STB 67-18). San Diego: U.S. Naval Personnel Research Activity, February 1967.

Fisher, W. E., Ward, J. H., Holdrege, F. E., & Lawrence, H. G. Prediction of unsuitability discharges (WADD-TN-60-260). Lackland Air Force Base, TX: Personnel Laboratory, Wright Air Development Division, Air Research and Development Command, U.S. Air Force, 1960.

Gordon, M. A., & Bottenberg, R. A. Prediction of unfavorable discharge by separate educational levels (PRL-TDR-62-5). Lackland Air Force Base, TX: 6570th Personnel Research Laboratory, Aerospace Medical Division, Air Force Systems Command, April 1962.

Kerlinger, F. N., & Pedhazur, E. J. Multiple regression in behavioral research. New York: Holt, Rinehart, & Winston, Inc., 1973.

Klieger, W. A., Dubuisson, A. U., & deJung, J. E. Prediction of unacceptable performance in the Army (Tech. Res. Note 113). Washington, D.C.: Human Factors Research Branch, TAG Research and Development Command, U.S. Army, June 1961.

Lockman, R. F. Chances of surviving the first year of service: A new technique for use in making recruiting policy and screening applicants for the Navy (CNS 1068). Arlington, VA: Center for Naval Analyses, January 1976.

Mosier, C. I. Problems and designs of cross-validation. Educational and Psychological Measurement, 1951 11, 5-11.

Navy Recruiting Manual, Enlisted (COMNAVCRUITCOM Instruction 1130.8A). Arlington, VA: Commander, Navy Recruiting Command, October 1974.

Plag, J. A. Pre-enlistment variables related to the performance and adjustment of Navy recruits. Journal of Clinical Psychology, 1962, 18, 168-171.

Plag, J. A., & Goffman, J. M. A formula for predicting effectiveness in the Navy from characteristics of high school students (Rep. 66-7). San Diego: U.S. Navy Medical Neuropsychiatric Research Unit, 1966.

Plag, J. A., & Goffman, J. M. The utilization of predicted military effectiveness scores for selecting naval enlistees (Rep. 69-6). San Diego: U.S. Navy Medical Neuropsychiatric Research Unit, 1968.

Sands, W. A. Cost of Attaining Personnel Requirements (CAPER) Model. In Mahnen, H. A., & Willing, R. C. (Eds.). Proceedings of the 12th Annual Conference, Military Testing Association. Indianapolis: U.S. Army Enlisted Evaluation Center, September 1970.

Sands, W. A. Determination of an optimal recruiting-selection strategy to fill a specified quota of satisfactory personnel (Res. Memo. WRM 71-34). Washington, D.C.: Naval Personnel Research and Development Laboratory, April 1971.

Sands, W. A. A method for evaluating alternative recruiting-selection strategies: The CAPER Model. Journal of Applied Psychology, 1973, 57, 222-227.

Sands, W. A. Prediction Of Enlisted Tenure - Two Years: The POET-2 Model. Proceedings of the 18th Annual Conference, Military Testing Association. Pensacola: Naval Education and Training Program Development Center, October 1976. (In press)

Taylor, H. C., & Russell, J. T. The relationship of validity coefficients to the practical effectiveness of tests in selection: Discussion and tables. Journal of Applied Psychology, 1939, 23, 565-578.

Ward, J. H., Jr., & Jennings, E. Introduction to linear models. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973.

REFERENCE NOTES

1. Plag, J. A. Predicting the effectiveness of naval enlistees. Tables and summary prepared for briefings at the Navy Department, Washington, D.C. San Diego: U.S. Navy Medical Neuropsychiatric Research Unit, May 1968.

2. Sands, W. A. Development of a revised Odds for Effectiveness (OFE) table for screening male applicants for Navy enlistment (NPRDC Tech. Note 76-5). San Diego: Navy Personnel Research and Development Center, April 1976.

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